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ABSTRACT

A review of schema theory and memory research shows how the organization of text can affect comprehension and how three reading strategies can aid in improving student understanding of content area materials. The three strategies that help students remember information from the author's point of view are webbing, pyramiding, and think sheets. They all highlight superordinate ideas and show how ideas relate to each other. The first strategy, webbing, is a graphic way to show important relationships defining the text structure. In a web diagram, the center of the web includes the topic or main ideas, while the spokes contain the related ideas. The second strategy, pyramiding, organizes information in a bottom-to-top processing model that groups information according to details, middle-level ideas, and main ideas. The third strategy involves the development of a think sheet for a specific expository passage. The think sheet, a "purpose setter" derived from chapter titles, headings, and subheadings, allows students to be aware of the need to set purposes for gaining information as they complete reading assignments. Think sheets serve as frameworks for predicting what information may be included in a passage, section, or chapter. (Practical instructional suggestions are offered for using these strategies.) (RL)

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Organizational Strategies to Increase Content Area Learning: Webbing, Pyramiding, and Think Sheets

INTERNATIONAL READING ASSOCIATION
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RATIONALE

One of the important goals of education today is for students to acquire information from their reading. In content areas, it is especially important for students to understand and remember as much as possible. Secondary teachers assume that when students reach the secondary level, they can read and remember content information. However, often teachers report that students have trouble learning from their textbooks. The implication is that students need to be taught how to read their textbooks. Elementary and secondary teachers can assist students in gaining meaning from text.

In an attempt to help students learn, many teachers use the strategy of asking questions about content students have read. Questioning assists students by focusing on certain aspects of text. Research has shown that when students are tested on aspects of text for which they were questioned previously, they tend to remember that content (Allen, 1970).

Although questioning can be a successful strategy, it has limited application when students have to read and remember information from the author's point of view. For this purpose, the organization of expository text becomes an important variable in students' understanding and remembering. Students need to understand how topics and supporting information relate to each other.

According to Anderson, Pichert, and Shirey (1979), knowledge of the structure of content area reading facilitates comprehension because it provides schemata or concepts for the reader to place topics and supporting details in relation to one another. Knowledge of the structure also provides readers with a network of abstract knowledge in memory to place these concepts while processing information (Rumelhart, 1980). Thus, knowing the structure of text can aid in organizing and storing information.

Expository text is organized by superordinate and subordinate ideas. Superordinate ideas correspond to topics and main ideas that have many levels of ideas beneath them. Subordinate or lower-level ideas explain and describe superordinate ideas. It has been found that good readers and listeners remember superordinate ideas better than specified subordinate ideas (Meyer, 1975). Other studies by Thorndyke (1977) and Taylor (1980) have confirmed this finding. Good readers also used the same structure as the author for organizing their recall protocols (Meyer, Brandt, and Bluth, 1980). Good readers who used the superordinate organization of the author were able to store information in memory and retrieve many more related ideas than poor readers.

If structural aspects facilitate remembering, it follows that strategies which focus on the organization of text

should be used to help students understand and remember what they read. In content area textbooks, information is often organized around a specific structure such as explanation, description, or cause and effect. Students are expected to understand these structures even if the author does not explicitly state them. If students cannot understand relationships and see the apparent structure, strategies using organizational structures can facilitate understanding and recall. Clues to the reader can be signaled so that ideas can be understood in relation to each other.

STRATEGIES

Three strategies which represent the author's organization are webbing, pyramiding, and think sheets. They all highlight superordinate ideas and show how ideas relate to each other.

The first strategy, webbing, is a graphic way to show important relationships defining the text structure. A web diagram is made. The center of the web includes to topic or main ideas, and the spokes contain the related ideas. The type of web is determined by the type of information in a passage. Webbing resembles a semantic mapping strategy developed by Armbruster and Anderson (1980) and also has similar features to a networking strategy by Dansereau, Collins, McDonald, Holley, Garland, Diekhoff, and Evans (1979).

The second strategy, pyramiding, is used to make a pyramid diagram of a text passage. As described by Solon (1980), a pyramid organizes information in a bottom-to-top processing model that groups information according to details, middle-level ideas, and main ideas. The strategy promotes interaction as students search, discuss, arrange, categorize, and label ideas for the pyramid.

The third strategy involves the development of a THINK SHEET for a specific expository passage. The THINK SHEET is a purpose setter derived from chapter titles, headings, and subheadings. The THINK SHEET allows students to be aware of the need to set purposes for gaining information as they complete reading assignments. THINK SHEETS serve as a framework for predicting what information may be in a passage or section of a chapter.

All three strategies have similar advantages. They facilitate memory processing by providing an organization similar to the author's. In addition, they encourage students to encode the content actively and meaningfully and to provide students with effective retrieval cues.

LEARNING FROM TEXT VARIABLES

Using the organization of text is just one variable influencing learning. Meaning is not in the text. Readers actively construct meaning (Spiro, 1980) in order to understand

and remember. Schema theory and memory research emphasize the importance of the background knowledge of the reader and the personal aspect of a reader's purpose, attitudes, and knowledge that shapes understanding and learning. This background knowledge representation is referred to as "schema" or "schemata" (the plural) in the literature (Anderson, 1977; Rumelhart & Ortony, 1977). Schema theories explain how new information is acquired and show the importance of what the reader brings to text. Reading comprehension results from an interaction between the reader and the text. Rumelhart and Ortony (1977) state that readers' schemata represent knowledge of objects, situations, events, and actions. They compare schemata to the structure of a play with its script. Like a play with a cast of characters and a sequence of scenes, schemata have parts and sequences of events. When reading, the reader chooses conceptual schemata to account for the text to be understood.

Thus, if the background knowledge of the reader does not include many of the schemata alluded to in the text, poor comprehension will result.

Another variable affecting comprehension and learning from text is memory. Not only are schemata useful for encoding information, they also play a major role in retrieving or remembering information. Rumelhart (1980) explains two processes by which schemata affect memory.

Schemata determine the form in which interpretations are stored, and they are used to reinterpret stored data. An experiment by Bransford and Franks (1971) shows these processes. Subjects were presented with three sentences, "The ants ate the sweet jelly, The jelly was on the table. The ants were in the kitchen." When subjects were presented with the whole idea, "The ants in the kitchen ate the sweet jelly which was on the table," they claimed it was a verbatim sentence they had previously read. They remembered the meaning of the sentence but their memory for the syntax was poor. The readers integrated the meaning into their memory structure.

A second insight from memory research alludes to the limitation of our short-term memories. Tarpy and Mayer (1978) point out that short-term memories are our conscious memories and are limited in capacity. Long-term memories have an infinite capacity but information must be organized to get into long-term memory. In long-term memory, information is represented in a meaningful and abstract way.

Kintsch and VanDijk (1978) have developed a model of memory storage that explains why superordinate ideas are recalled more than subordinate ideas. According to their model, superordinate ideas are more frequently retrieved from long-term memory and are kept in short-term memory as old propositions to be related to new information. The

better recall of main ideas then can be explained because they are processed differently than lower-level ideas.

A review of the research shows that in order for information to be learned, ideas must be organized and have a meaningful framework for the reader to recall information. Superordinate ideas are recalled and retained better than subordinate ideas. Webbing, pyramiding, and think sheets incorporate important features of learning theories because they provide readers with a way to assimilate information and encode it in their memories. They use the author's organization to represent ideas and their interrelationships. These strategies lead students to attend to processing the relationships in order to translate meaning into a diagram.

INSTRUCTIONAL SUGGESTIONS

Procedures for each of the strategies and purposes for which teachers and students use the strategies differ. The following practical suggestions are geared for teachers to use with students:

Webbing can be used to identify specific organizations (e.g., cause and effect, description, explanation, comparison) in the text. The procedure is:

1. Draw a circle for the center of the web.
2. Have students look for the topic or main idea in

a paragraph, page, or chapter and write it in the center.

3. Ask students to look for related ideas and place these on the spokes.
4. Have students write sub-ideas on new spokes and continue until all ideas are exhausted.

Pyramiding can be used to distinguish superordinate ideas, middle-level ideas, and details. It can be used to review content during class discussions, to prepare students for outlining skills, and to take notes for a written report. The procedure is:

1. Students read a chapter section or short article.
2. Students read aloud facts from the passage; the instructor writes each fact on large index cards, one fact to a card.
3. Using magnets, the instructor displays the cards in random order on a board for all to see.
4. Selected students then sort the cards into groups and arrange the groups on one horizontal line on the board. This line forms the base blocks of the pyramid.
5. The instructor chalks in the next step of the pyramid and solicits labels for the groups on the base line. The labels form the second tier of building blocks.
6. Drawing the third tier, but leaving it blank, the

instructor skips to the block at the very top of the pyramid. To arrive at the subject of the pyramid, the instructor asks, "What is the whole thing about?" The subject is written in one or two words in the top block.

7. Finally, students agree upon a complete sentence which includes all the information in the pyramid so far. This statement is derived by asking the question, "What is the author saying about the subject? "

THINK SHEETS can be used as frameworks to set purposes for reading. The procedure is:

1. Use a specific chapter or section of a textbook.
2. List all headings and subheadings (usually bold faced or italic). Leave spaces between each. If no subheadings are given, list phrases for first sentences of each paragraph.
3. Ask students to think about what information might be included under each heading and subheading and discuss it with partners. Have students record their predictions.
4. Have students read the chapter or section to assess the accuracy of their predictions.
5. Have students meet with original partners to revise information recorded according to text information.

SUMMARY

If teachers assist students by using these strategies that focus on the author's organization, students will become actively involved in their search for meaning in their content area textbooks and will more likely remember what they read. The goal is for students to use these strategies independently so that they will be effective learners on their own.

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